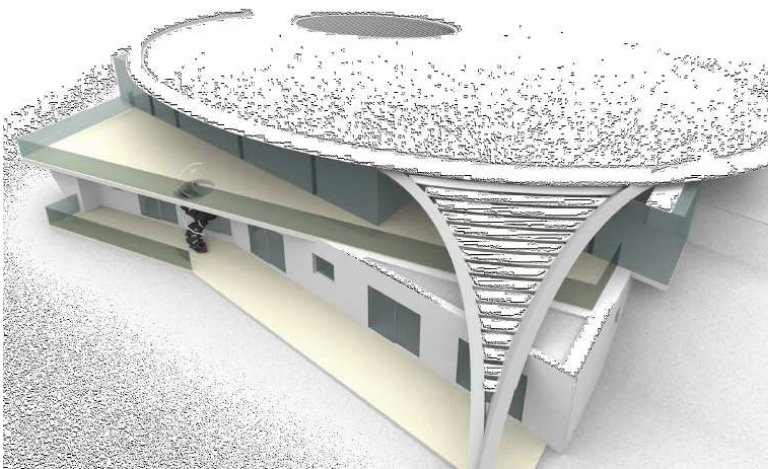


## “Energy in the Code” Pre-planning Design Advice

Achieving Code for Sustainable Homes Level 6,  
Managing Risk & Controlling Costs



### Client:

Leading Energy

### Completion date:

May 2010

### Project scope:

- NHER Plan Assessor SAP modelling
- Code for Sustainable Homes (CSH) energy advice
- Government policy and incentive scheme study
- LZC technology review and feasibility study

### Project Description:

The National Energy Foundation (NEF) was commissioned by the client to provide a study on identifying and meeting Code for Sustainable Homes (May 2009 version 2) (CSH) requirements concerning the integration of Low or Zero Carbon (LZC) technologies to achieve **CSH level 6**.

The study estimated carbon emissions and energy consumption of the house/flat types from SAP calculations using accredited modelling software NHER Plan Assessor v4.5 (SAP2005 v9.81).

### Project Outcome:

The feasibility study identified and summarised the appropriate LZC technologies considered for the client which ensured the compliance to CSH Level 6 for Ene 1—Dwelling Emission Rate.

In association with the study, an Excel format matrix was developed to demonstrate the detailed breakdown of how to achieve CSH level 6 for each energy option.

Code for Sustainable Homes (May 09 version 2)		NHER	
Design - Draft			
<i>This report is approved by BRE as evidence to demonstrate compliance with issues ENE 1, 2 and 7 of the Code for Sustainable Homes.</i>			
<small>This Design Assessment has been carried out by an Authorised SAP Assessor. It has been prepared from plans and specifications and may not reflect the property as constructed. Code calculations are from the Technical Guide (May 09 version 2).</small>			
Assessor name	MR. Yu Wang	Assessor number	1
Client	Cathie Eberlin	Last modified	30/06/2010
Address	11, 1, TQ12 5TW		
<b>Building regulation assessment - criterion 1</b>			
			<b>kg/m<sup>2</sup>/yr</b>
DER			-1.98
TER			21.95
<b>Assessment of zero carbon home and low or zero carbon technologies</b>			
		<b>Credits</b>	<b>Level</b>
Dwelling emission rate (Ene 1)	CO <sub>2</sub> reduction = 109%	15	6
Building fabric (Ene 2)	HLP = 0.77	2	
Low or zero carbon technologies (Ene 7)	CO <sub>2</sub> reduction = 90%	2	
<b>Ene 1 - dwelling emission rate</b>			
			<b>% kWh/m<sup>2</sup> kg/m<sup>2</sup>/yr</b>
<b>Assessment of Ene 1 (level 3-5)</b>			
DER from SAP 2005 DER worksheet			-1.98
CO <sub>2</sub> emissions from mechanical cooling			0.00
Sub total CO <sub>2</sub> emissions			-1.98
CO <sub>2</sub> emissions offset from community biomass CHP systems			0.00
Additional allowable generation	0.00		
CO <sub>2</sub> emissions offset from generation			0.00
Total CO <sub>2</sub> reduction from low or zero carbon technologies			0.00
Total predicted CO <sub>2</sub> emissions			-1.98
CO <sub>2</sub> reduction compared to TER			23.93
CO <sub>2</sub> reduction as % of TER	109.02		
<b>Assessment of Ene 1 (level 6) and zero carbon home</b>			
DER from SAP 2005 DER worksheet			-1.98 (ZC1)
CO <sub>2</sub> emissions from appliances and cooking			3.32 (ZC2)
Sub total CO <sub>2</sub> emissions			1.34 (ZC3)
Additional LEL and no assumed secondary heating			-1.37 (ZC4)
CO <sub>2</sub> emissions offset from community biomass CHP systems			0.00 (ZC5)
Additional allowable generation and its CO <sub>2</sub> emissions offset	0.00		
CO <sub>2</sub> emissions offset from generation			0.00 (ZC7)
Net CO <sub>2</sub> emissions			-0.03 (ZC8)
CO <sub>2</sub> emissions from mechanical cooling			0.00 (ZC9)
Total predicted CO <sub>2</sub> emissions			-0.03
URN: biomass 3 version 1 Plan Assessor version 4.5.25 SAP version 9.81			

## Project Benefit:

NEF completed various options to model different design features that were proposed by the client. Each option was carefully assessed in order to:

- Understand both energy use and carbon emissions and compare against benchmarks;
- Assess potential for energy demand reduction;
- Identify opportunities for suitable renewable energy technologies.

A detailed lifecycle cost analysis demonstrating the financial impact over the lifetime of the home also assisted the client in identifying possible cost savings.

NEF completed a comprehensive and practical 'measures matrix' which the client has found invaluable in **unlocking the constraints of CSH and understanding the most cost effective route to compliance.**

### Renewable technologies considered:

- Solar thermal and photovoltaic panels
- Ground source heating and cooling
- Air source heating and cooling
- Biomass boilers
- Micro wind turbine



option	1	2	3	4	5	6	7	8	9	10	11	12	13
RE	GSHP 1	GSHP 2	GSHP 3	GSHP 4	ASHP 1	ASHP 2	ASHP 3	ASHP 4	Biomass 1	Biomass 2	Biomass 3	Biomass 4	Biomass 5
Solar flat plate	ST - 4.3m2	ST - 4.3m2	ST - 4.3m2	ST - 4.3m2	ST - 4.3m2	ST - 4.3m2	ST - 4.3m2	ST - 4.3m2	ST - 4.3m2	ST - 4.3m2	ST - 4.3m2	ST - 4.3m2	ST - 4.3m2
secondary	Wood burner 65%	Wood burner 65%	Wood burner 65%	Wood burner 65%	Wood burner 65%	Wood burner 65%	Wood burner 65%	Wood burner 65%	Wood burner 65%	Wood burner 65%	Wood burner 65%	Wood burner 65%	Wood burner 65%
Structure	Hemcrete	Hemcrete	Hemcrete	Hemcrete	Hemcrete	Hemcrete	Hemcrete	Hemcrete	Hemcrete	Hemcrete	Hemcrete	Hemcrete	SIPS
Thermal mass	not in SAP 2005	not in SAP 2005	not in SAP 2005	not in SAP 2005	not in SAP 2005	not in SAP 2005	not in SAP 2005	not in SAP 2005	not in SAP 2005	not in SAP 2005	not in SAP 2005	not in SAP 2005	not in SAP 2005
Roof	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
Floor	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
Walls	0.15	0.15	0.13	0.15	0.13	0.11	0.13	0.11	0.15	0.15	0.13	0.11	0.09
Windows	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
U value	0.03	0.04	0.05	0.03	0.05	0.05	0.05	0.05	0.08	0.03	0.03	0.04	0.08
Optimum AP	2	2	2	2	2	2	2	2	2	2	2	2	2
MVHR	SFP 0.65, 87%	SFP 0.65, 87%	SFP 0.65, 87%	SFP 0.65, 87%	SFP 0.65, 87%	SFP 0.65, 87%	SFP 0.65, 87%	SFP 0.65, 87%	SFP 0.65, 87%	SFP 0.65, 87%	SFP 0.65, 87%	SFP 0.65, 87%	SFP 0.65, 87%
PV for level 6	10.7kWp	10.7kWp	10.7kWp	10.7kWp	10.7kWp	10.7kWp	11.5kWp	11.5kWp	7.5kW	7.2 kWp	7.2 kWp	7.2 kWp	7.5kWp
Wind Turbine				Yes									
DER	-1.85	-1.74	-1.61	-9.47	-0.99	-1.06	-1.78	-1.85	-2.21	-1.98	-1.99	-1.98	-2.17
TER	31.06	31.06	31.06	31.06	31.06	31.06	31.06	31.06	21.95	21.95	21.95	21.95	21.95
HLP	0.77	0.80	0.80	0.77	0.80	0.79	0.80	0.79	0.90	0.77	0.76	0.77	0.86
CSH level	6	5	5	6	5	5	6	6	5	6	6	6	5
Lighting fittings	30 LELs	30 LELs	30 LELs	30 LELs	30 LELs	30 LELs	30 LELs	30 LELs	30 LELs	30 LELs	30 LELs	30 LELs	30 LELs

## NEF's Added Value:

NEF's unique position in the energy efficiency and renewables sector, enables us to provide independent and unbiased advice to a variety of different organisations. NEF's consultants undertake feasibility studies, strategic reviews and provide policy advice to businesses, local authorities and developers. In addition to this consultancy work, NEF is frequently involved in delivering projects through partnerships with other providers. Please visit our website at [www.nef.org.uk](http://www.nef.org.uk) to find out more.

### For further information please contact:

Jack Wang

Tel: +44 (0) 1908 665 555

Fax: +44 (0) 1908 665 577

Direct: +44 (0) 1908 256 912

Email: [jack.wang@nef.org.uk](mailto:jack.wang@nef.org.uk)

The National Energy Foundation, The National Energy Centre, Davy Avenue, Knowlhill, Milton Keynes, MK5 8NG

Registered charity No: 298951